

Lead Poisoning 101



Jo Rhodes

Marion County Health Department

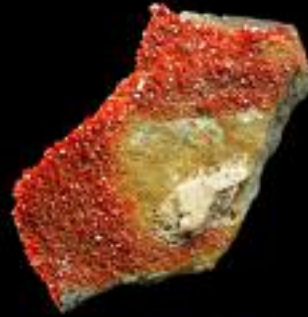
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Indiana State Department of Health

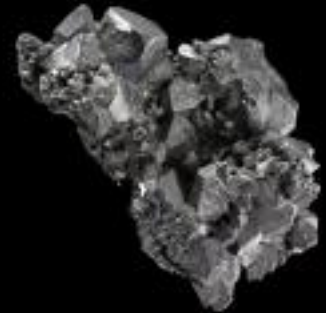
Lead is a naturally occurring metal



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Periodic Table of the Elements

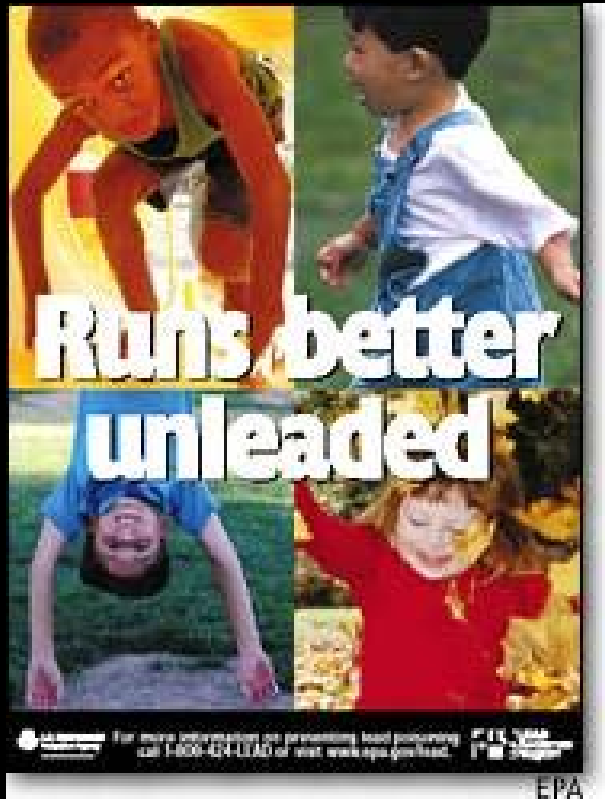
1 H																	2 He
3 Li	4 Be											5 B	6 C	7 N	8 O	9 F	10 Ne
11 Na	12 Mg											13 Al	14 Si	15 P	16 S	17 Cl	18 Ar
19 K	20 Ca	21 Sc	22 Ti	23 V	24 Cr	25 Mn	26 Fe	27 Co	28 Ni	29 Cu	30 Zn	31 Ga	32 Ge	33 As	34 Se	35 Br	36 Kr
37 Rb	38 Sr	39 Y	40 Zr	41 Nb	42 Mo	43 Tc	44 Ru	45 Rh	46 Pd	47 Ag	48 Cd	49 In	50 Sn	51 Sb	52 Te	53 I	54 Xe
55 Cs	56 Ba	57 La	72 Hf	73 Ta	74 W	75 Re	76 Os	77 Ir	78 Pt	79 Au	80 Hg	81 Tl	82 Pb	83 Bi	84 Po	85 At	86 Rn
87 Fr	88 Ra	89 Ac	104 Unq	105 Unp	106 Unh	107 Uns	108 Uno	109 Une	110 Unn								

58 Ce	59 Pr	60 Nd	61 Pm	62 Sm	63 Eu	64 Gd	65 Tb	66 Dy	67 Ho	68 Er	69 Tm	70 Yb	71 Lu
90 Th	91 Pa	92 U	93 Np	94 Pu	95 Am	96 Cm	97 Bk	98 Cf	99 Es	100 Fm	101 Md	102 No	103 Lr



- hydrogen
- alkali metals
- alkali earth metals
- transition metals
- poor metals
- nonmetals
- noble gases
- rare earth metals

How Much is Too Much?



**"There is no safe level
of blood lead"**

Dr. Bruce Lanphear

What are the symptoms?

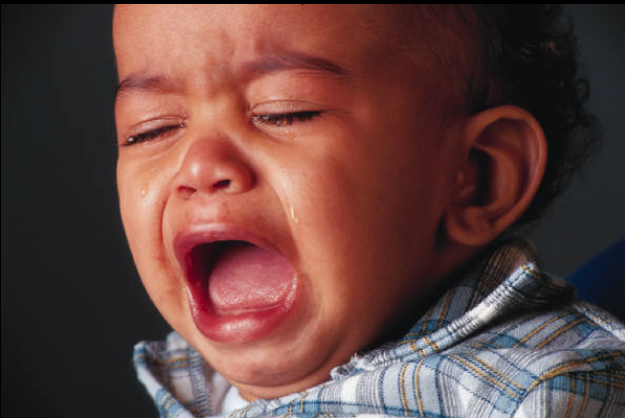


fatigue

stomach ache



sluggishness



irritability



Low-Level Exposure Effects

$\leq 10 \mu\text{g/dL}$



- **Decline in IQ of 4 to 7 points per 10 mcg**
- **Hyperactivity**
- **Disinterest**
- **Social withdrawal**

Effects of Exposure >10 mcg

- **Delayed Growth**
- **Hypertension**

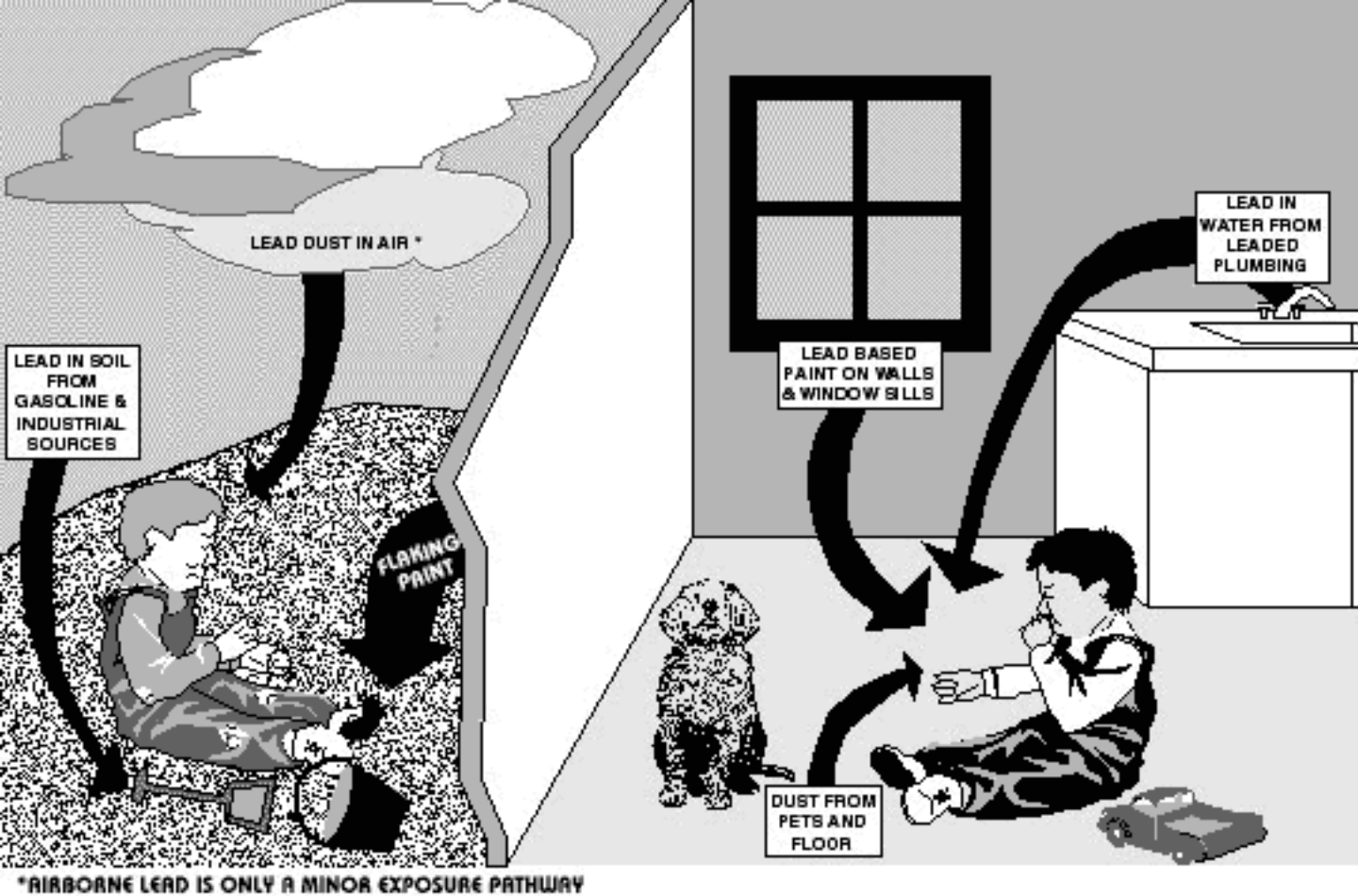
- **Anemia**
- **Speech problems**
- **Hearing loss**



High-level Exposure Effects

- Seizures
- Encephalopathy
- Death

QuickTime™ and a
TIFF (Uncompressed) decompressor
are needed to see this picture.



Secondary Prevention



- Identify children with lead poisoning
- Provide medical and developmental assistance to mitigate effects on child
- Identify and eliminate lead hazards to prevent further poisoning

Developmental Screening

- Ongoing developmental screening in coordination with child's physician beginning with diagnosis, and continuing throughout primary school
- Developmental intervention
 - Head start
 - First Steps
 - School-based services



Children At-Risk



- Living or cared for in older buildings
- Exposed to renovation and remodeling activities
- Exposed to people whose hobbies or work involve lead
- Recent immigrants

Children At-Risk



- Urban or Rural
 - Clusters of lead poisoning
- Any Race or Ethnicity
 - Minority populations
 - Ethnic groups
- Rich or Poor
 - Low-income families
 - Uninsured or medicaid

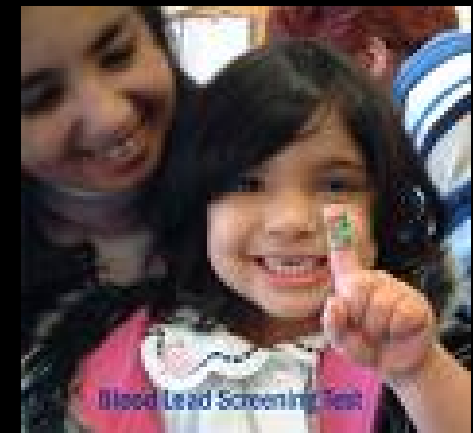
Testing Children for Lead Exposure

- Blood Lead Test – Capillary

Advantages	Disadvantages
Inexpensive	Initial cost if Lead Care II
Easy (Finger stick)	False Positives (Contamination/calibration)
Fast (Lead Care II)	Not automatically reported

- Types of Capillary tests

- Capillary tubes
- Filter paper
- Lead Care II



Testing Children for Lead Exposure

- Blood Lead Test – Venous

Advantages	Disadvantages
Accuracy (Gold Standard)	Difficulty
No special supplies needed	Pain
“Stat” Results for in-patients	Cost



When are Xrays helpful?



- Sudden increase in a blood lead level
- Child with a known history of mouthing objects who presents with severe lead poisoning
- Very high levels of lead in blood



Lead Poisoning Prevention Program • 1-800-LA-4-LEAD

Treatment of Lead Poisoning

- To reduce lead burden and prevent further health effects
- Does not reverse damage already done
- Can have serious negative effects, including death



LEAD POISONING
THE SILENT MENACE...

Test Your Home. Test Your Child.

Is YOUR CHILD SAFE?
Call: 1.800.433.0746

The advertisement features a large black and white photograph of a young child's face, looking directly at the camera with their hand near their mouth. To the left of the main image, there are three smaller, square inset photos: a crying baby, a close-up of a child's face, and a young girl smiling. The background of the advertisement is a mix of colors, including a prominent red and yellow area on the left side.

Who should be considered for treatment?

- Confirmed Blood Lead Level >45 not due to acute ingestion of leaded object.



How is Lead Poisoning Treated?

Oral chelation



DMSA (Succimer)

IV chelation



Calcium EDTA

Primary Prevention



- **Sources of lead and factors increasing risk of hazards**
- Responsible agencies and organizations
- Steps to control or eliminate lead hazards

Lead has a long history of use



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**These walls don't
just look good.**

They're Yummy Too!

**New Flavored Lead-Based
Paint and Varnish**

Great Flavors!

Pistacio (Shown)

Cotton Candy

Lemon

Marshmallow

Dutch Boy



Lead is Not



Current uses of lead



Current uses of lead



Current uses of lead



Occupational/Hobby Sources

- Remodeling construction
- Smelters
- Automotive repair
- Battery factories
- Firing ranges
- Construction/painting



Keeping Up



- Ceramic tableware from China
 - www.cfsan.fda.gov/~comm/ceramic.html
- Non-food consumer products
 - www.recalls.gov
 - Searches
 - Automatic notification
- Testing for Lead in Food
 - www.ocreger.com/multimedia/lead/

Factors Influencing Risk Level



- Time
- Acidity Level
- Temperature



Where Is the Risk Greatest?

Of the children poisoned, 80% of the exposures came from housing.

- Lead paint in homes built prior to 1978 places children at risk for lead poisoning.
- The older the home the higher the risk for lead hazards.
- 90% of the pre-1950 housing where the poisoned children lived had lead based paint hazards.



Relationship Between Age of House and Lead Hazards

Prevalence of significant lead-based paint hazard in housing

Construction Year	% Houses with Hazard
1978-1998	3
1960-1977	8
1940-1959	43
Before 1940	68

Over 30% of housing had dust lead hazards although the interior lead-based paint was in good condition

National Survey, 1998-2000 *Source: Jacobs D.E*

Primary Prevention



- Sources of lead and factors increasing risk of hazards
- **Responsible agencies and organizations**
- Steps to control or eliminate lead hazards

Federal Authorities



- Environmental Protection Agency, EPA
www.epa.gov/lead
- Food and Drug Administration, FDA
www.fda.gov/default.htm
- Consumer Product Safety Commission, CPSC
www.recalls.gov
- Occupational Safety and Health Association, OSHA
www.osha.gov
- Centers for Disease Control and Prevention, CDC
www.cdc.gov

State Authorities

- Legislators
- Attorney General www.in.gov/attorneygeneral/
- Indiana Department of Environmental Management, IDEM www.in.gov/idem/
- Indiana State Department of Health, ISDH www.in.gov/isdh/
- Indiana Occupational Safety and Health Association, IOSHA www.in.gov/dol/iosha.htm

Local Authorities

- Municipalities
- Housing Authorities
- Health departments



National and Local Advocacy

- Improving Kids Environment, IKE www.ikecoalition.org
- National Center for Healthy Housing, NCHH www.nchh.org
- National Environmental Health Association, NEHA www.neha.org
- Sierra Club www.sierraclub.org
- American Lead Poisoning Help Association, ALPHA www.alphalead.org



Primary Prevention



- Sources of lead and factors increasing risk of hazards
- Responsible agencies and organizations
- **Steps to control or eliminate lead hazards**

Common uses of lead - now banned



Past Efforts



- 1970s
 - Phase-down of leaded gasoline (EPA)
 - Efforts to reduce lead levels in canned foods (FDA)
 - Lead Based Paint Poisoning Prevention Act passed by Congress in 1971
- 1980s
 - Studies show lead exposure adversely affects cognitive function in children and fetuses
- 1990s
 - 10 ug/dL set as action level (CDC)
 - Recognition that there may be no threshold

FDA Actions in 1990s to Present

- Ban of lead soldered food cans
- Ban of lead foil seals for wine bottles
- Lowered lead limit for bottled water
- Lowered lead leach limits for glazed ceramicware
- Established limit for lead in wine
- Established limit for lead in candy, 1995 (0.5 ppm), tightened in 2006 (0.1 ppm)

Housing and Urban Development

- Residential Lead-Based Paint Hazard Reduction Act of 1992
 - Title X, Disclosure Rule
 - Protect families from exposure to lead from paint, dust, and soil

www.hud.gov/offices/lead/enforcement/disclosure.cfm

2008 EPA Actions



- Toxic Substances Control Act of 1976 amended
 - Submission of health and safety information on lead content of children's products required
 - Excluding children's metal jewelry
 - Applies to certain manufacturers and importers of consumer products intended for use by children
- Renovation, Repair, and Painting (RRP)
 - Target housing or child-occupied facilities built before 1978
 - Activities performed for compensation after April 22, 2010

Consumer Product Safety Commission

- Consumer Product Safety Improvement Act of 2008
 - Update of Consumer Product Safety Act of 1972
 - Section 101. Children's Products Containing Lead; Lead Paint on Consumer Products Rule

www.cpsc.gov/about/cpsia/sect101.html



Funding & Resources

- Community Development Block Grants
- Federal grants-HUD, CDC, EPA
- Community foundations
- Financial institutions
 - Community Reinvestment Act
- Retailers
- Environmental Management Institute, EMI www.envtlmgmt.org



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"Sorry, kids—everything else
had toxins in it this year."